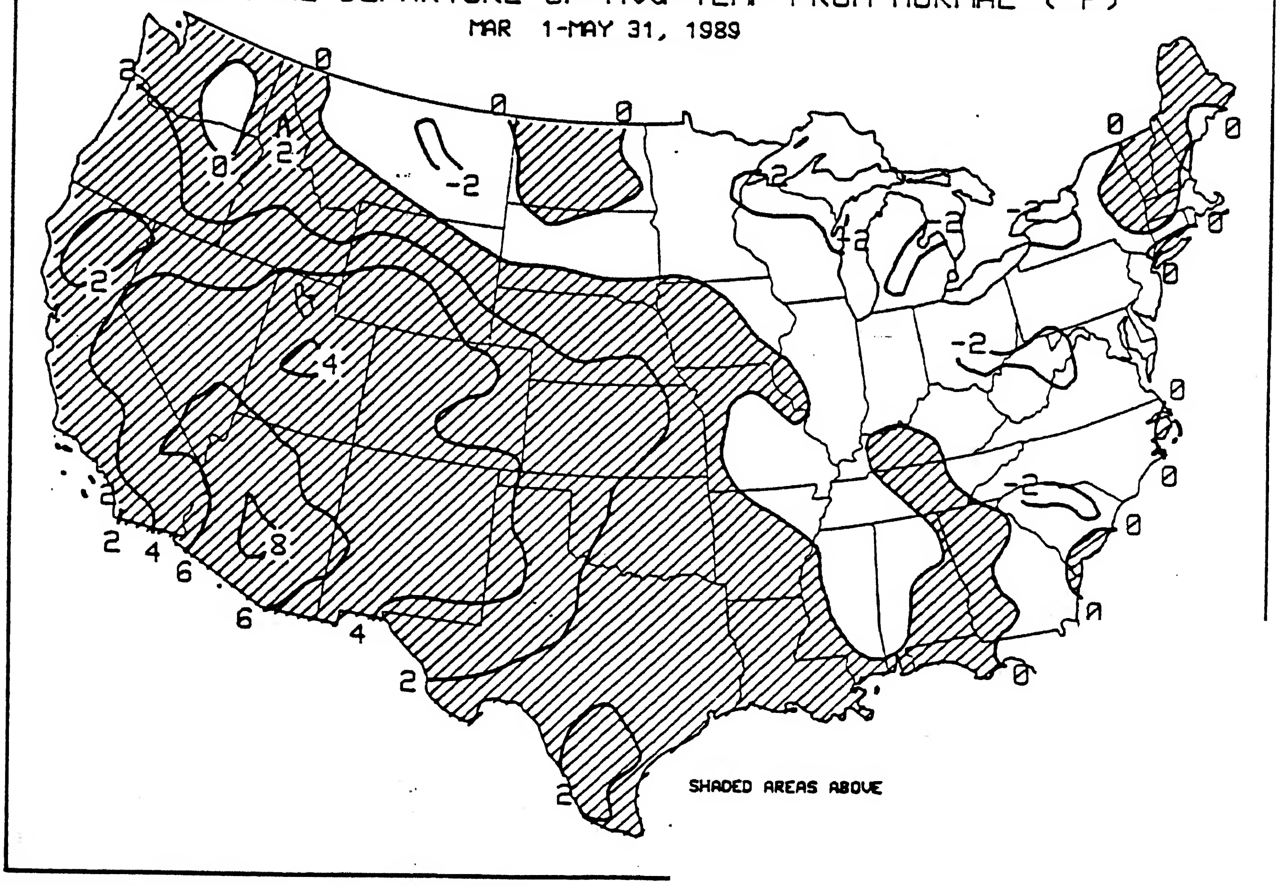
CLIMATE ANALYSIS CENTER

CONTAINS:
1989 U.S. SPRING CLIMATE SUMMARY

WEEKLY CLIMATE BULLETIN

No. 89/23 Washington, DC June 10, 1989



SEASONAL DEPARTURE OF AVG TEMP FROM NORMAL (° F)
MAR 1-MAY 31, 1989

UNSEASONABLE WARMTH PERSISTED ACRC
THE U.S. DURING THE SPRING AS THE SO
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TO THE UNITED STATES SEASONAL CLIMATE

UNITED STATES DEPARTM
NATIONAL OCEANIC AND ATMOS
NATIONAL WEATHER SERVICE - NATIO

WEEKLY CLIMATE BULLETIN

This Bulletin is issued weekly by the Climate Analysis Center and is designed to indicate, in a brief, concise format, current surface climatic conditions in the United States and around the world. The Bulletin contains:

- Highlights of major climatic events and anomalies.
- U.S. climatic conditions for the previous week.
- U.S. apparent temperatures (summer) or wind chill (winter).
- Global two-week temperature anomalies.
- Global four-week precipitation anomalies.
- Global monthly temperature and precipitation anomalies.
- Global three-month precipitation anomalies (once a month).
- Global twelve-month precipitation anomalies (every 3 months).
- Global three month temperature anomalies for winter and summer seasons.
- Special climate summaries, explanations, etc. (as appropriate).

Most analyses contained in this Bulletin are based on preliminary, unchecked data received at the Center via the Global Telecommunication System. Similar analyses based on final, checked data are likely to differ to some extent from those presented here.

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GLOBAL CLIMATE HIGHLIGHTS

MAJOR CLIMATIC EVENTS AND ANOMALIES AS OF JUNE 10, 1989

1. North-Central United States:

DRY POCKETS REMAIN.

Increased rainfall (approaching 43 mm) in the region limited the area of persistent dryness to an isolated area where less than 5 mm of precipitation was reported [12 weeks].

2. Eastern United States:

MOIST TREND PREVAILS.

Wet conditions continued as widespread significant rainfall of up to 125 mm returned to the area [6 weeks].

3. Southern Great Plains and Gulf Coast:

TORRENTIAL RAINS OCCUR.

Severe storms that dumped as much as 423 mm of rain created flooding problems at a few locations while more widespread amounts ranging from 100 mm to 200 mm saturated soils across the region [4 weeks].

4. Eastern Mexico and Southern Texas:

HEAT WAVE PERSISTS.

Above normal temperatures approaching 5°C continued over the area as maximum temperatures reached 42°C in portions of Mexico [4 weeks].

5. Sahelian West Africa:

TORRID CONDITIONS DEVELOP.

A sluggish start to the rainy season in the Sahel has provided little relief from temperatures that have risen to 48°C and averaged 6°C above normal [6 weeks].

6. Turkey:

SCANTY PRECIPITATION OBSERVED.

Recent rainfall of less than 16 mm, while beneficial, has provided most locations a minimal reprieve from long-term dryness that persists across the region [13 weeks].

7. Manchuria and Southeastern Soviet Union:

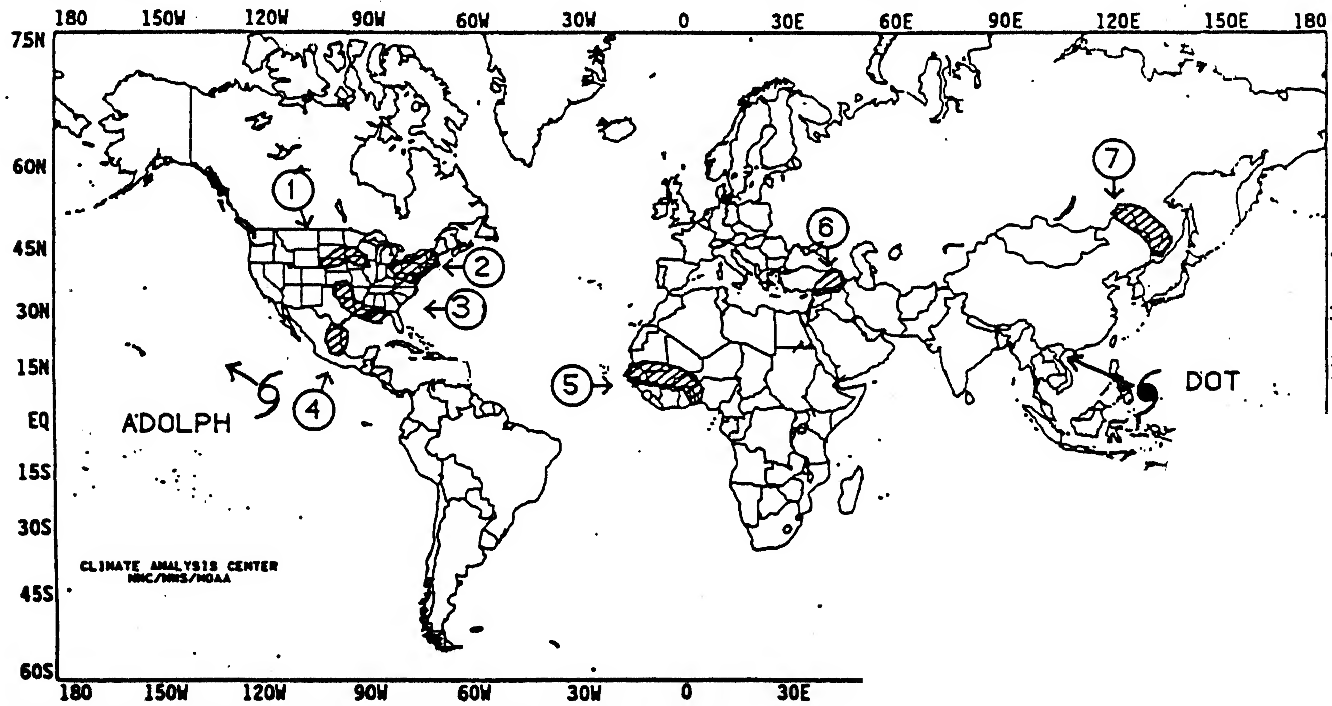
RAINS CONTINUE TO EASE DRYNESS.

Another week with widespread significant rainfall (up to 41 mm) in the area has sufficiently ameliorated precipitation deficits [Ended at 5 weeks].

8. Eastern Australia:

"BIG WET" FLARES.

Rains that had subsided in recent weeks increased in intensity recently with amounts nearing 268 mm recorded at some locations [13 weeks].



EXPLANATION

TEXT: Approximate duration of anomalies is in brackets. Precipitatior week's values.

MAP: Approximate locations of major anomalies and episodic events current two week temperature anomalies, four week precipitation an

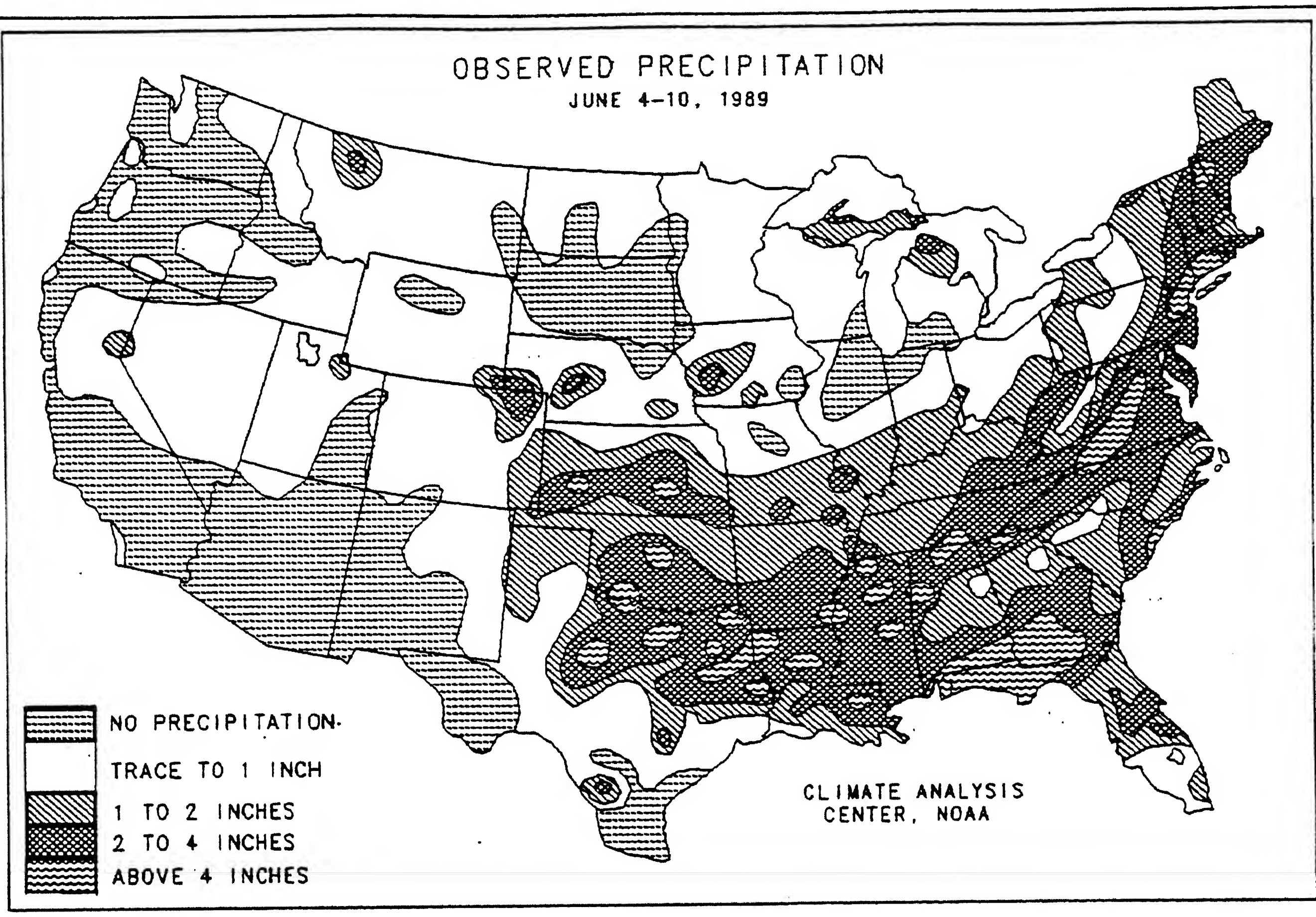
UNITED STATES WEEKLY CLIMATE HIGHLIGHTS

FOR THE WEEK OF JUNE 4 THROUGH JUNE 10, 1989.

For the sixth week out of the last seven, the south-central Great Plains experienced heavy precipitation. Additionally, most of the Gulf Coast, Southeast, and the Atlantic Seaboard recorded moderate to heavy rainfall. Most of the precipitation was the result of a cold front that stalled from central Kansas southward to northeastern Texas, then eastward across the Deep South and northeastward up the Atlantic Coast. From Monday through Wednesday, small waves of low pressure formed along the front and generated widespread light to moderate rain with embedded severe weather complexes across the region. The Gulf Coast was hardest hit by the severe weather. Intense cloudbursts caused widespread flooding across much of the Florida Panhandle while a powerful tornado tore through downtown Baton Rouge, LA. Farther west, severe weather also battered parts of the central Great Plains. Isolated parts of southeastern Kansas were buried by small hail that accumulated up to a foot deep while heavy rains, damaging winds, and scattered tornadoes affected many locations from Texas to Nebraska. Tornadoes also touched down in many states across the Southeast in conjunction with the frontal severe weather outbreaks. Some flooding occurred in northeastern Texas as well as in portions of North Carolina and Virginia. This cold front finally pushed out of the region later in the week, ushering in cooler, drier weather for the weekend. Farther west, a warm front brought showers and thunderstorms to western Nebraska and eastern portions of Colorado and New Mexico late in the week. Scattered reports of hail and a single tornado, which touched down in southern Colorado, accompanied this system. In addition, northern portions of Utah, Nevada, and California received widespread light rain and a couple of rare tornadoes. Warm and dry weather prevailed in most ... except in Hilo while drier weather returned ...uthern and southwestern Alaskan coasts.

...ing to the River Forecast Centers, the ...ipitation fell in southern Alabama and in ... Florida, where several stations measured ...s of rain (see Figure 1). Some locations in the Florida panhandle were inundated by more than 5 inches of rain in three hours. Amounts of 5 to 8 inches fell across the remainder of the central Gulf Coast as well as in central and northeastern Texas, southern Kansas, northern Oklahoma, and a large part of North Carolina and Virginia (see Figures 1 and 2). Widespread heavy precipitation (between 2 and 5 inches) fell across the south-central Plains, lower Mississippi Valley, southern Appalachians, mid-Atlantic and New England (see Table 1). Light to moderate amounts were recorded in the Great Basin, the northern and central Rockies, and throughout most of the eastern half of the nation. Little or no precipitation fell along the Pacific Coast, in the desert Southwest, southern Texas, middle Missouri Valley, and the central Corn Belt. Most of Hawaii experienced a relatively dry week, although easternmost sections received near normal precipitation, while south-central and southwestern Alaska also observed below normal rainfall.

Warm, humid weather dominated the Northwest, extreme southern Plains, the Southwest, and the southern half of the Atlantic Coast while a pair of cool Canadian high pressure centers combined with persistent cloud cover to keep cool air entrenched in the Midwest and eastern Great Lakes. The greatest positive temperature departures (between +5°F and +7°F) were found in the northern Rockies, northern Intermountain West, and Pacific Northwest (see Table 2). Southern Texas experienced temperatures 3°F to 6°F above normal as did coastal sections of the mid-Atlantic. Slightly above normal temperatures affected peninsular Florida, the southern Appalachians, central Arizona, and the Great Basin. In contrast, parts of the central and southwestern Great Plains and northwestern portions of the Great Lakes observed temperatures 6°F to 8°F below normal while most of the eastern Plains, Mississippi Valley, and southern and western Ohio Valley reported temperatures 2°F to 5°F below normal (see Table 3). Most of Hawaii observed slightly above normal temperatures while seasonable temperatures were recorded throughout Alaska.


OBSERVED PRECIPITATION
JUNE 4-10, 1989
NO PRECIPITATION
TRACE TO 1 INCH
1 TO 2 INCHES
2 TO 4 INCHES
ABOVE 4 INCHES
CLIMATE ANALYSIS
CENTER, NOAA

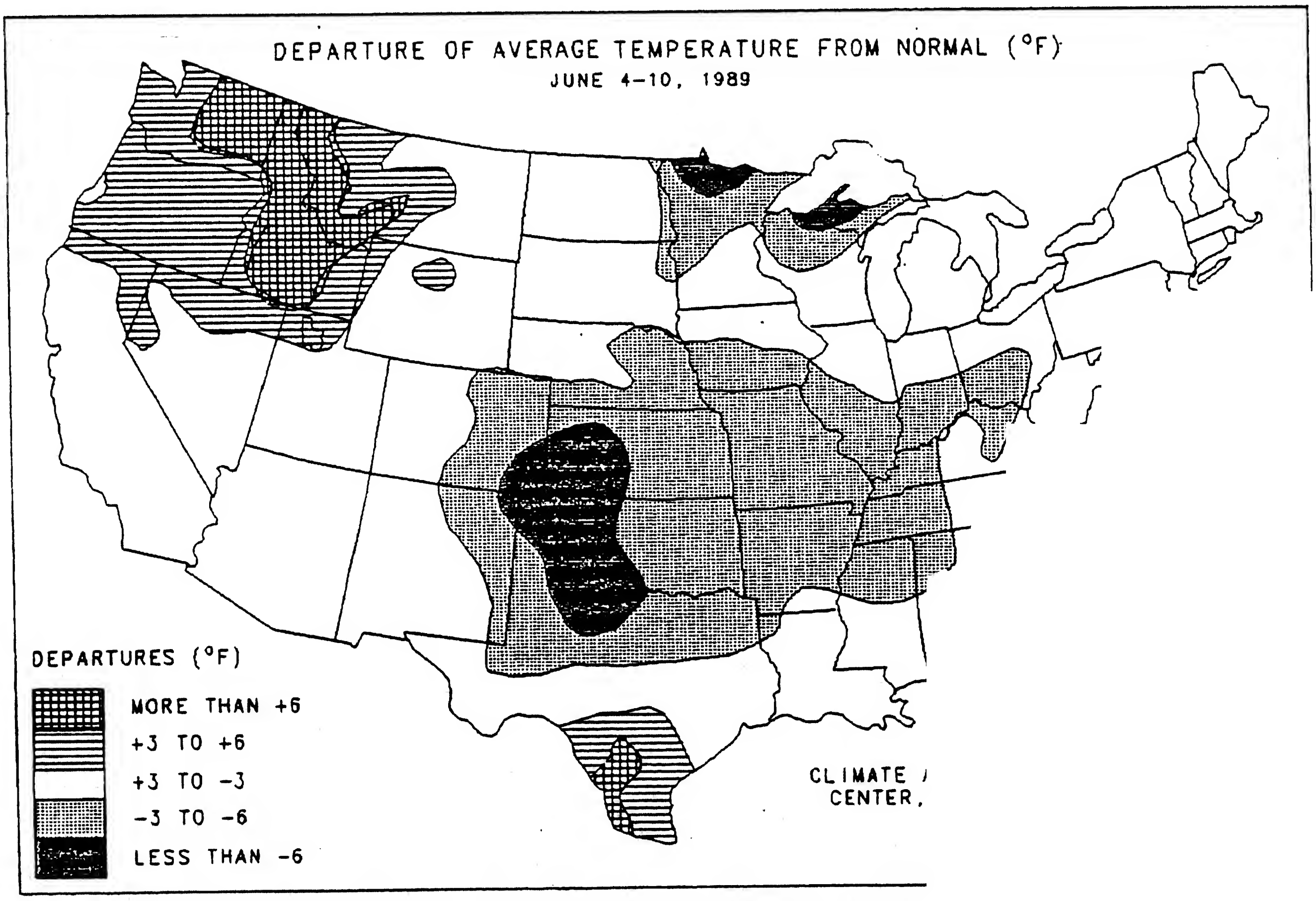

DEPARTURE OF AVERAGE TEMPERATURE FROM NORMAL (°F)
JUNE 4-10, 1989
DEPARTURES (°F)
MORE THAN +6
+3 TO +6
+3 TO -3
-3 TO -6
LESS THAN -6
CLIMATE
CENTER,

TABLE 1. Selected stations with 4.00 or more inches of precipitation for the week.

STATION	TOTAL (INCHES)	STATION	TOTAL (INCHES)
MILTON/WHITING NAS, FL	16.67	WICHITA/MCCONNELL AFB, KS	4.94
PANAMA CITY/TYNDALL AFB, FL	8.38	ISLIP, NY	4.90
FT. WORTH/MEACHAM, TX	7.49	MERIDIAN NAS, MS	4.84
FT. WORTH/CARSWELL AFB, TX	6.91	WICHITA FALLS, TX	4.79
SHREVEPORT, LA	6.80	APALACHICOLA, FL	4.76
SHREVEPORT/BARKSDALE AFB, LA	6.69	NEW YORK/KENNEDY, NY	4.67
VALDOSTA, GA	6.64	MT. WASHINGTON, NH	4.59
ABILENE, TX	6.35	HUNTSVILLE, AL	4.58
MEMPHIS NAS, TN	5.79	DALLAS NAS, TX	4.53
PENSACOLA, FL	5.75	GARDEN CITY, KS	4.49
VALPARAISO/EGLIN AFB, FL	5.72	WICHITA, KS	4.46
LYNCHBURG, VA	5.70	OKLAHOMA CITY/TINKER AFB, OK	4.39
ABILENE/DYESS AFB, TX	5.48	WILLOW GROVE NAS, PA	4.35
DALLAS/FT. WORTH, TX	5.44	DOVER AFB, DE	4.33
MYRTLE BEACH AFB, SC	5.37	VALDOSTA/MOODY AFB, GA	4.07
OZARK/CAIRNS AFB, AL	5.36	TUPELO, MS	4.04
TALLAHASSEE, FL	4.94		

TABLE 2. Selected stations with temperatures averaging 4.0°F or more ABOVE normal for the week.

STATION	DEPARTURE (°F)	AVERAGE (°F)	STATION	DEPARTURE (°F)	AVERAGE (°F)
WENATCHEE, WA	+7.4	72.8	WALLA WALLA, WA	+5.1	69.6
BURLEY, ID	+6.9	66.9	CUT BANK, MT	+5.1	60.1
HELENA, MT	+6.9	64.5	BROWNSVILLE, TX	+4.7	86.6
LEWISTON, ID	+6.8	70.3	RENO, NV	+4.7	64.7
BOISE, ID	+6.7	69.8	SEATTLE/TACOMA, WA	+4.7	63.4
SPOKANE, WA	+6.7	66.0	ASTORIA, OR	+4.7	60.1
MISSOULA, MT	+6.7	63.8	ATLANTIC CITY, NJ	+4.6	71.5
BOZEMAN, MT	+6.4	61.2	WINNEMUCCA, NV	+4.6	65.4
YAKIMA, WA	+6.2	68.5	KINGSVILLE NAS, TX	+4.5	86.6
BEEVILLE NAS, TX	+6.0	87.0	IDAHO FALLS, ID	+4.5	62.8
REDMOND, OR	+6.0	62.3	NEW BERN, NC	+4.4	78.7
NORFOLK, VA	+5.9	78.4	SALEM, OR	+4.3	63.3
KALISPELL, MT	+5.9	62.1	PORTLAND, OR	+4.2	64.9
MCALLEN, TX	+5.8	88.1	EUGENE, OR	+4.2	63.5
SAN ANTONIO, TX	+5.6	86.1	QUILLAYUTE, WA	+4.2	58.4
SALISBURY, MD	+5.6	75.2	HAMPTON/LANGLEY AFB, VA	+4.1	76.3
ALICE, TX	+5.3	87.4	WORLAND, WY	+4.1	66.3
MEDFORD, OR	+5.3	68.0	POCATELLO, ID	+4.0	63.8
BUTTE, MT	+5.3	58.1	BELLINGHAM, WA	+4.0	61.1

TABLE 3. Selected stations with temperatures averaging 4.0°F or more BELOW normal for the week.

STATION	DEPARTURE (°F)	AVERAGE (°F)	STATION	DEPARTURE (°F)	AVERAGE (°F)
MARQUETTE, MI	-7.8	49.6	BLYTHEVILLE AFB, AR	-4.9	71.8
GARDEN CITY, KS	-7.8	64.2	PUEBLO, CO	-4.8	64.0
DODGE CITY, KS	-7.5	64.7	SPRINGFIELD, MO	-4.8	66.5
GAGE, OK	-7.0	67.3	BELLEVILLE/SCOTT AFB, IL	-4.8	68.6
HANCOCK/HOUGHTON CO., MI	-6.7	49.8	COLUMBIA, MO	-4.7	66.8
INTERNATIONAL FALLS, MN	-6.7	52.2	LITTLE ROCK, AR	-4.7	72.1
WICHITA FALLS, TX	-6.5	72.1	CLOVIS/CANNON AFB, NM	-4.6	67.6
HOBART, OK	-6.4	70.3	HARRISON, AR	-4.6	67.7
PARK FALLS, WI	-6.3	54.1	KANSAS CITY/INTL., MO	-4.6	68.3
AMARILLO, TX	-6.3	66.5	CHANUTE, KS	-4.6	68.3
GOODLAND, KS	-6.2	60.9	ENID/VANCE AFB, OK	-4.6	70.9
ABILENE, TX	-6.0	72.6	DES MOINES, IA	-4.5	64.8
TRINIDAD, CO	-5.9	60.8	JACKSON, TN	-4.5	71.0
RUSSELL, KS	-5.9	66.1	COLUMBUS, OH	-4.4	64.1
LUBBOCK, TX	-5.5	70.4	CONCORDIA, KS	-4.4	66.9
FT. SILL/HENRY POST AAF, OK	-5.5	71.5	SPRINGFIELD, IL	-4.3	66.6
WICHITA, KS	-5.4	68.3	WEST PLAINS, MO	-4.3	66.8
TUCUMCARI, NM	-5.4	68.9	SALINA, KS	-4.3	68.3
COLORADO SPRINGS, CO	-5.3	57.7	MUSCLE SHOALS, AL	-4.3	70.7
PADUCAH, KY	-5.2	68.3	OTTUMWA, IA	-4.2	65.6
DALLAS/FT. WORTH, TX	-5.1	74.3	JONESBORO, AR	-4.2	72.0
EVANSVILLE, IN	-4.9	67.9	AKRON, CO	-4.1	60.2
JOPLIN, MO	-4.9	68.2	TULSA, OK	-4.1	71.4

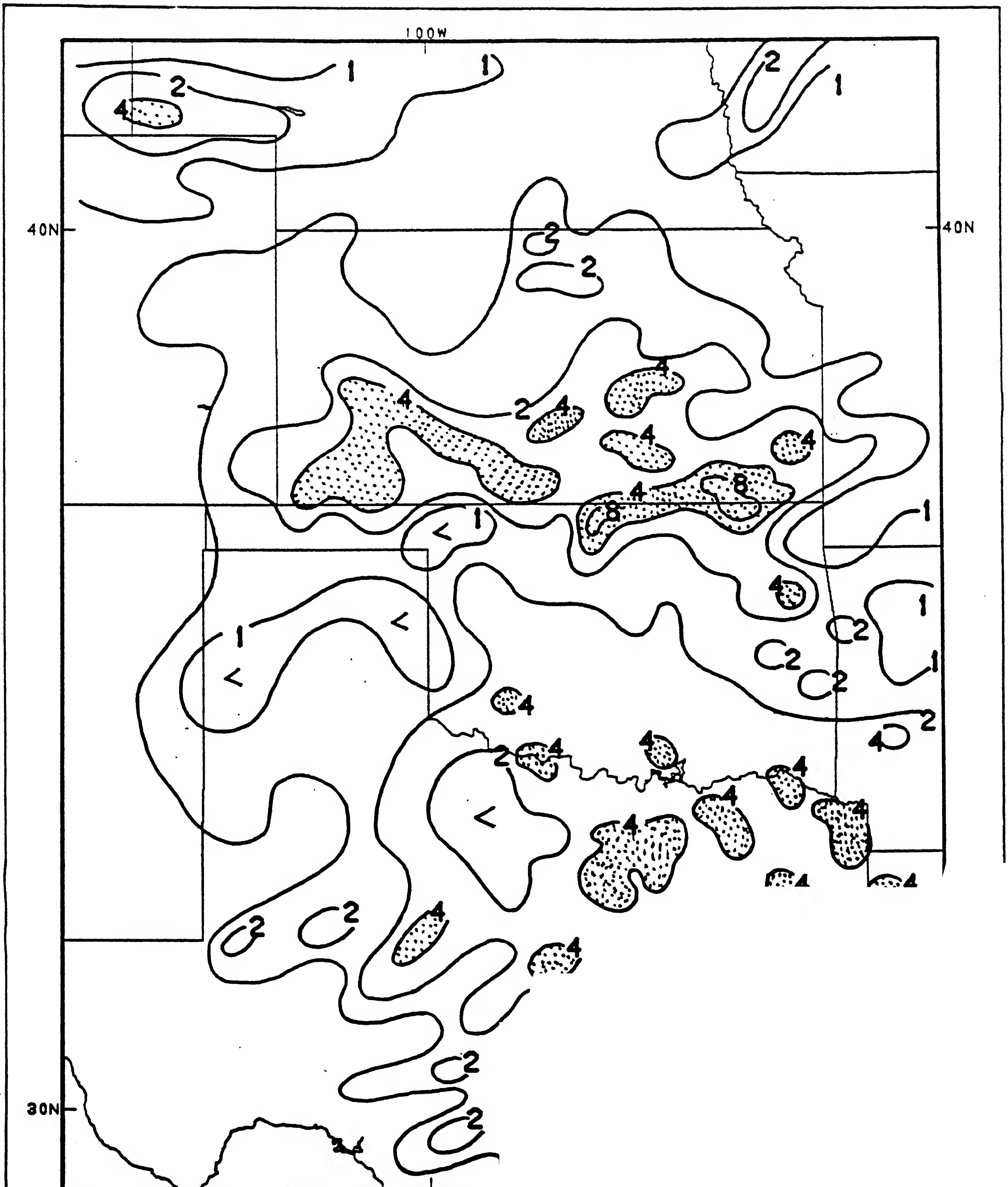


Figure 1. Total precipitation (inches) during June 4-
the River Forecast Centers stations. Isopleths are on
are more than 4 inches. Last week marked the six
fallen on most locations in the south-central Great P

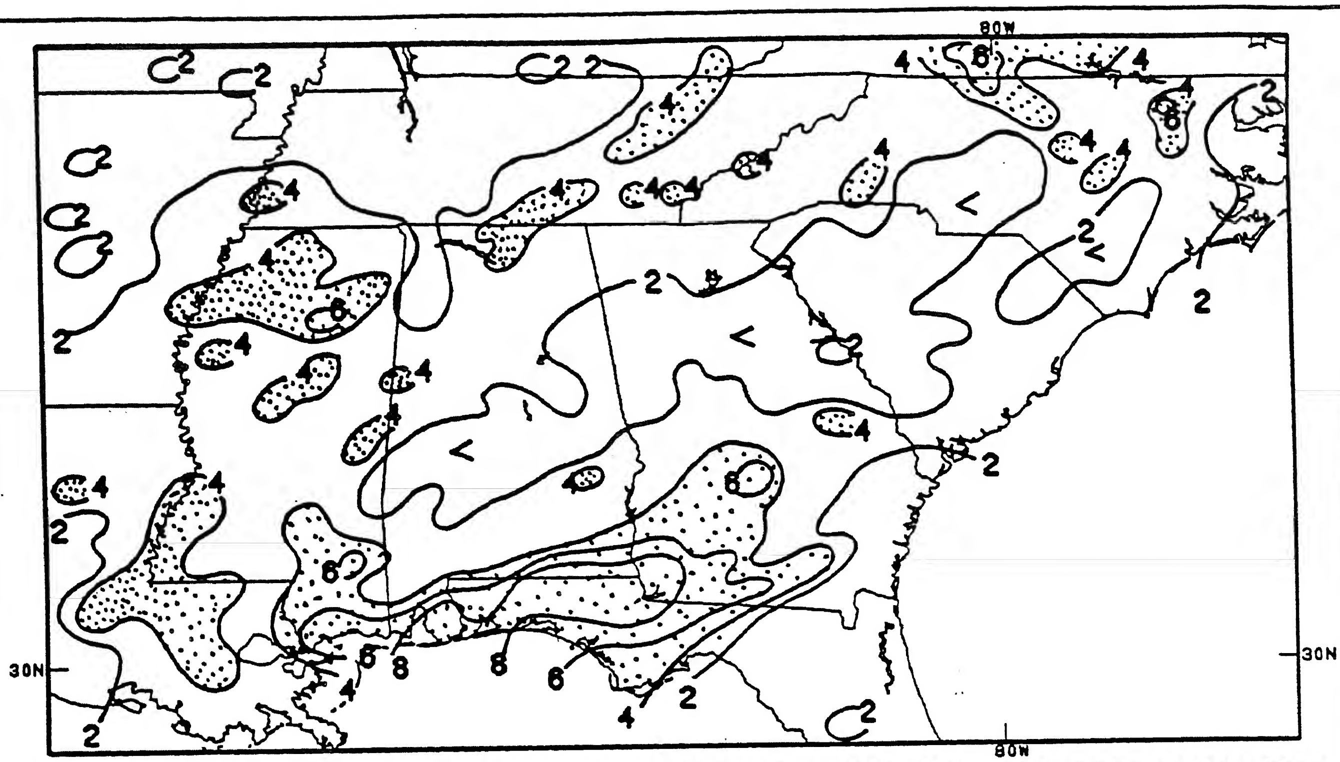
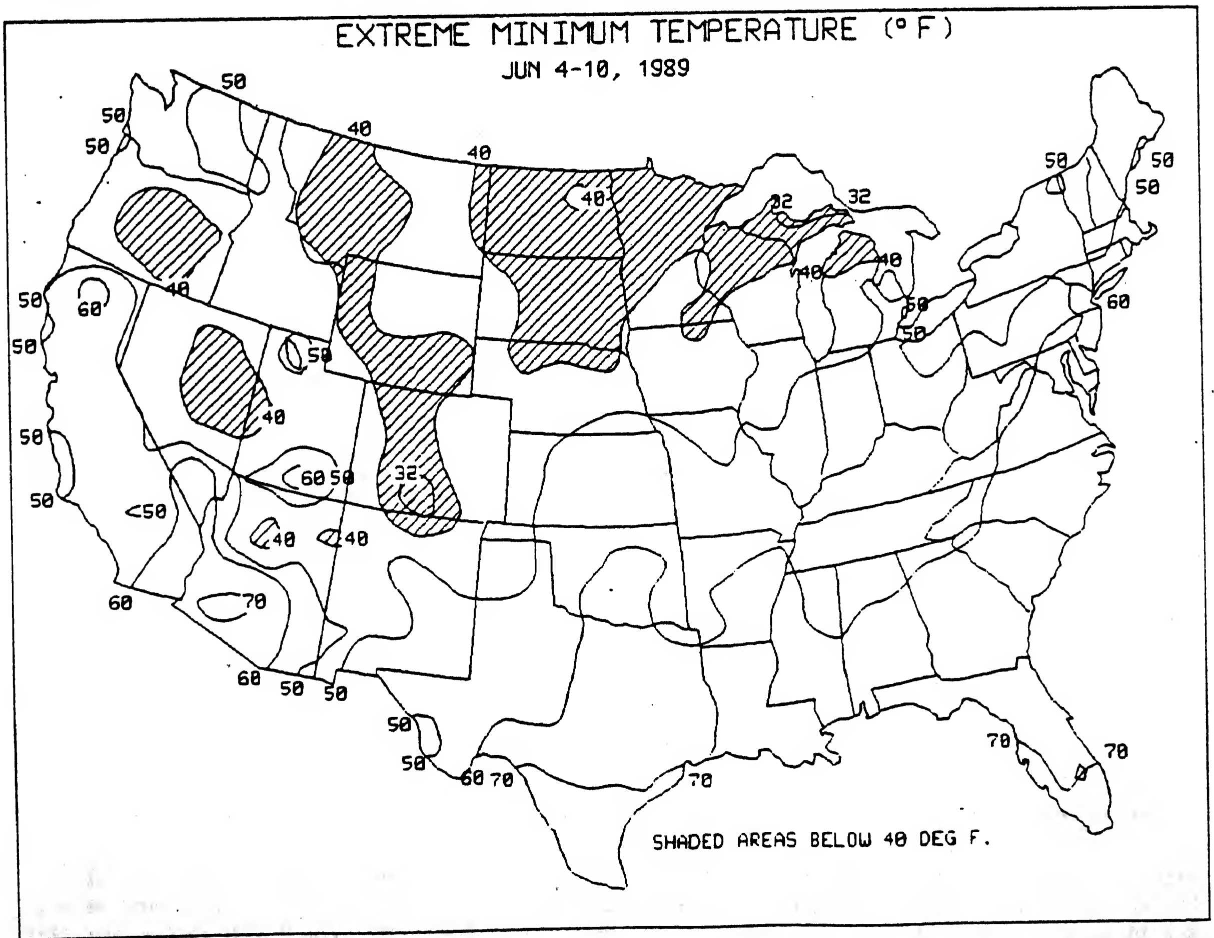
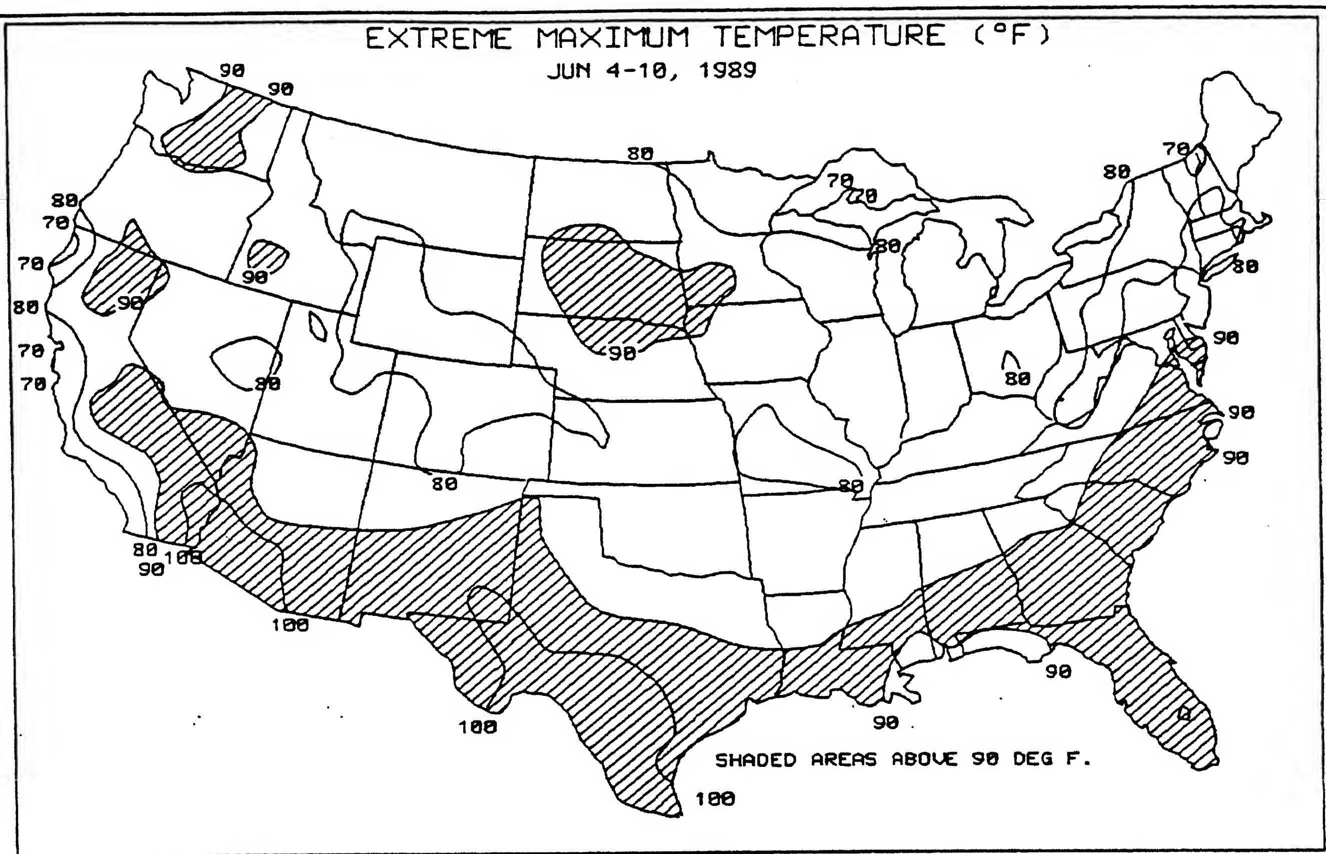


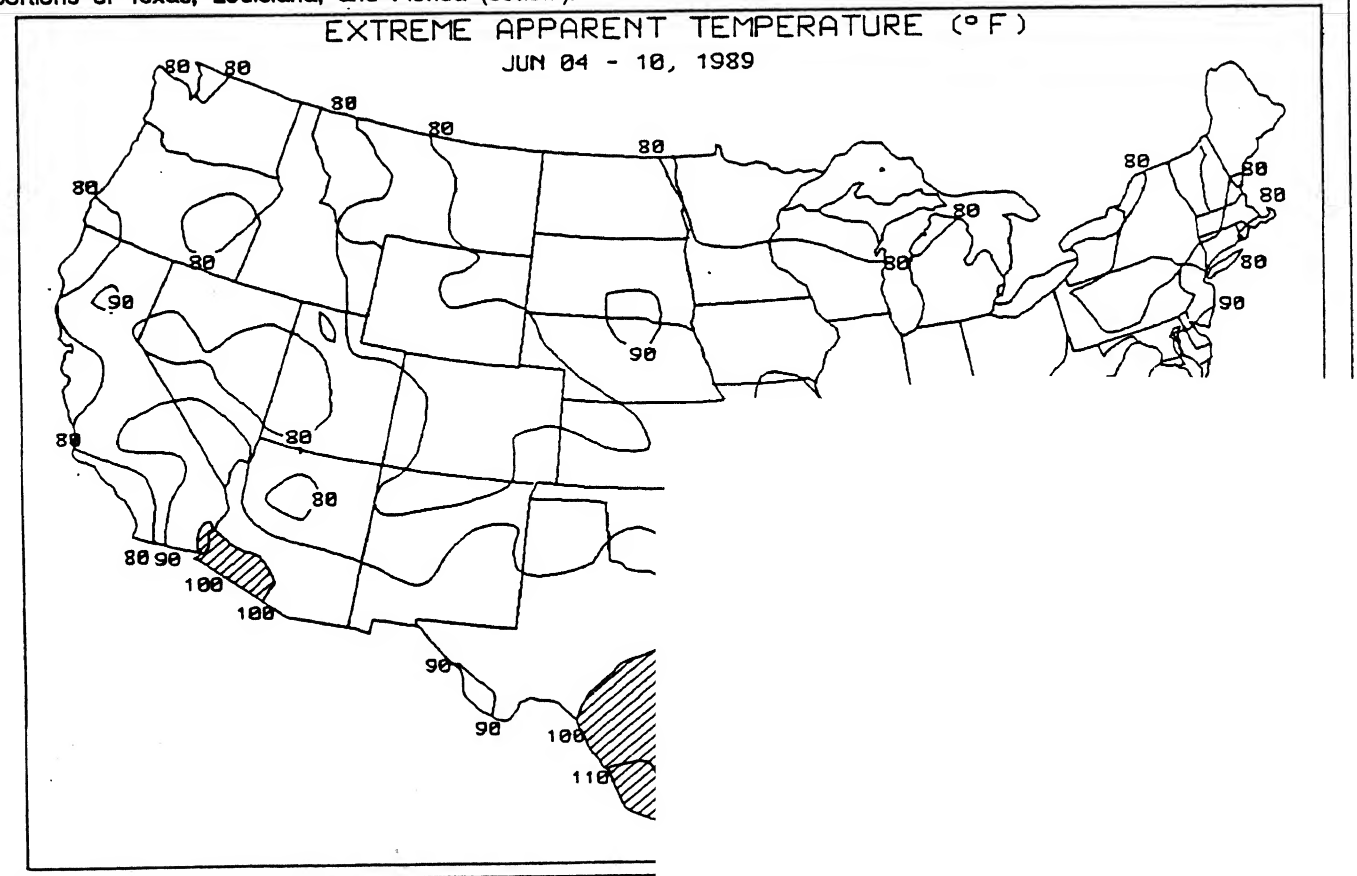
Figure 2. Total precipitation (inches) during June 4-10, 1989 based upon first-order synoptic, airways, and the River Forecast Centers stations. Isopleths are only drawn for 1, 2, 4, 8 inches, and stippled areas are more than 4 inches. Up to 16.7 inches of rain caused severe flooding along parts of the central and eastern Gulf Coast, most notably in southern Alabama and northwestern Florida.

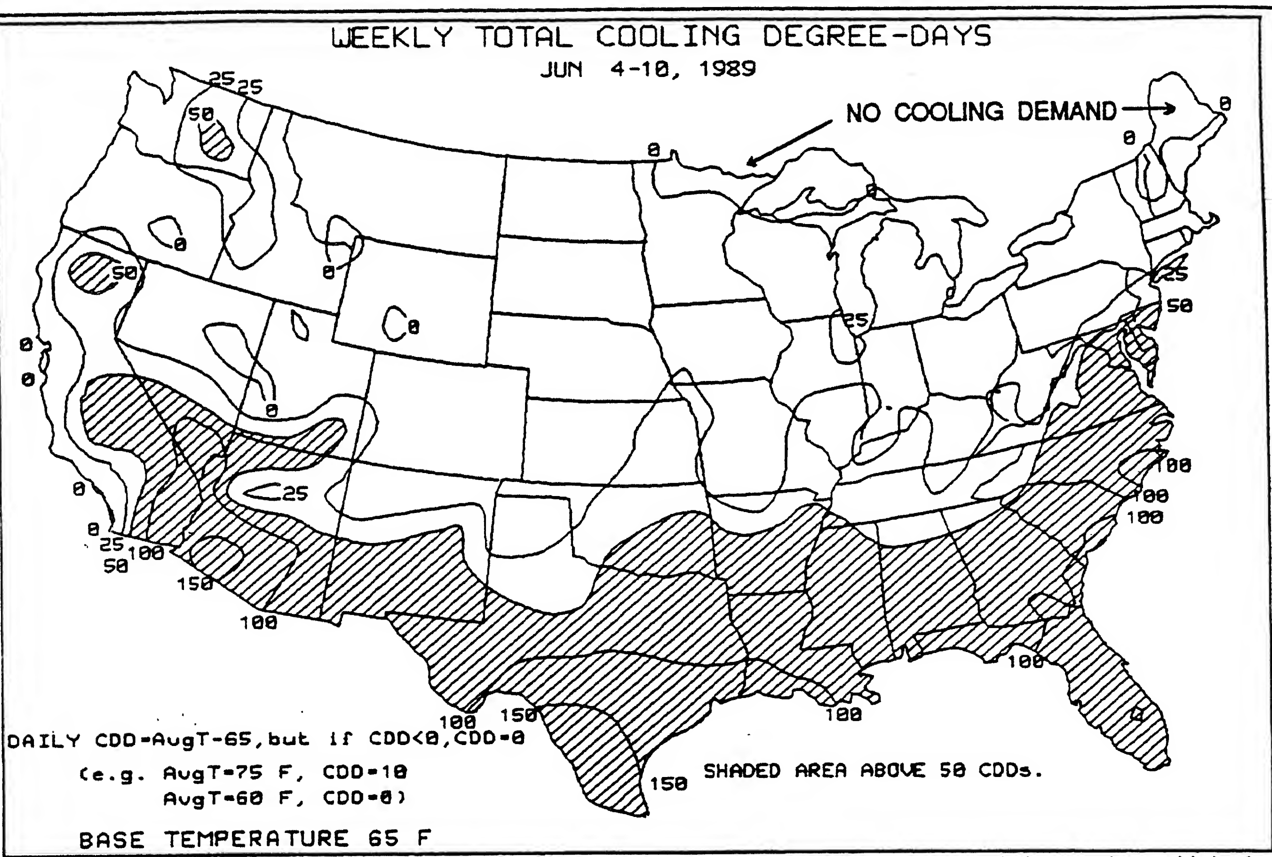


Extreme minimum temperatures (°F) during the week of June 4-10, 1989. Cool air over the northern Plains and Great Lakes, Rockies, and Intermountain West dropped readings into the thirties while warm, muggy weather kept lows in the seventies across southern Texas and southern Florida.

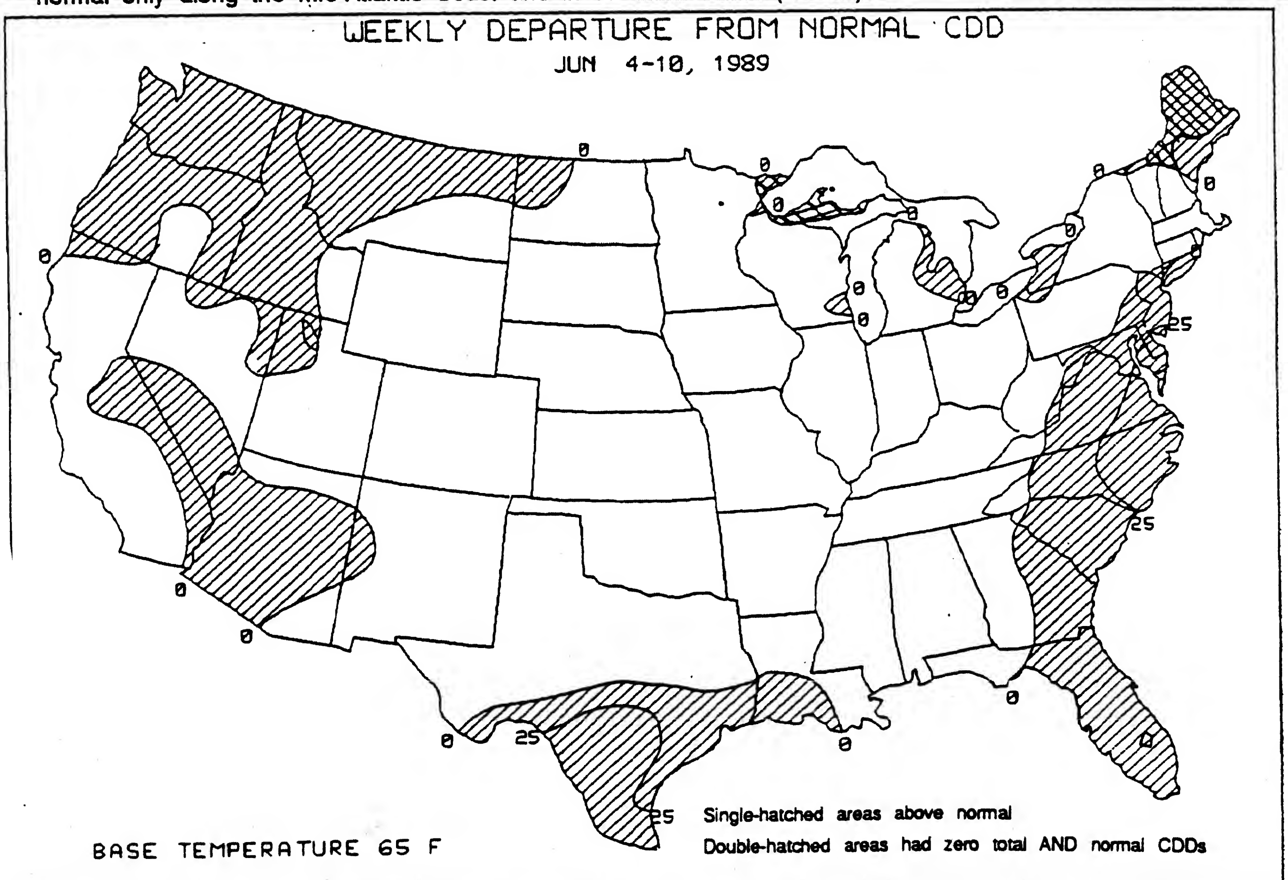


Readings in the nineties were observed across the southern tier of states, the southern half of the Eastern Seaboard, in parts of the Intermountain West, and throughout most of the Middle Missouri Valley (top), but relatively dry air kept extreme apparent temperatures below 100°F everywhere except in parts of the desert Southwest and the southern portions of Texas, Louisiana, and Florida (bottom).



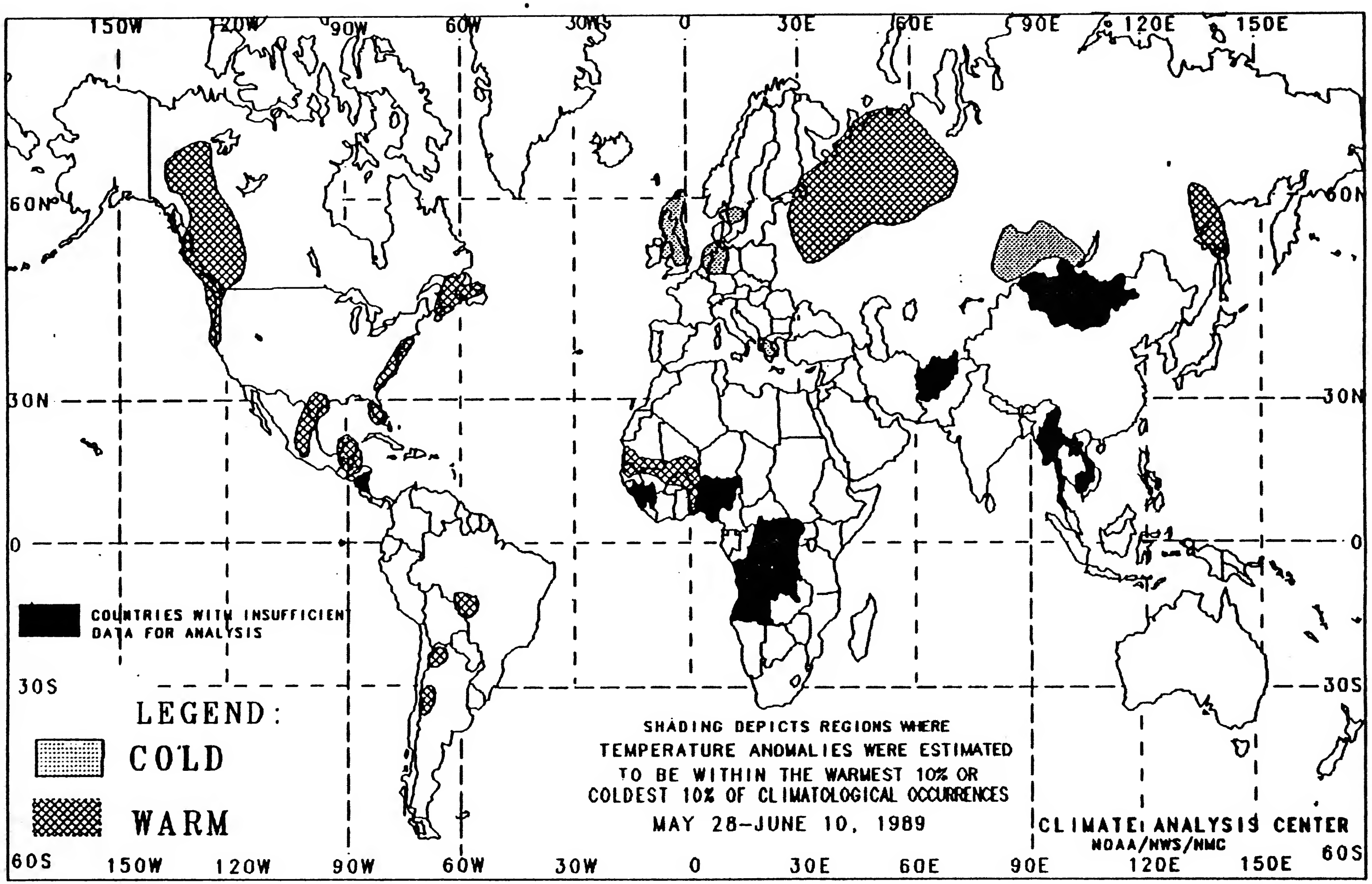


The southern and middle Atlantic Coasts, northern Intermountain region, and most of the southern third of the nation recorded more than 50 CDDs (top). However, air-conditioning demand was significantly above normal only along the mid-Atlantic Coast and in southern Texas (bottom).



GLOBAL TEMPERATURE ANOMALIES

2 WEEKS



The anomalies on this chart are based on approximately 2500 observing ɔns for which at least 13 days of temperature observations were received synoptic reports. Many stations do not operate on a twenty-four hour s so many night time observations are not taken. As a result of these ing observations the estimated minimum temperature may have a warm . This in turn may have resulted in an overestimation of the extent of e warm anomalies.

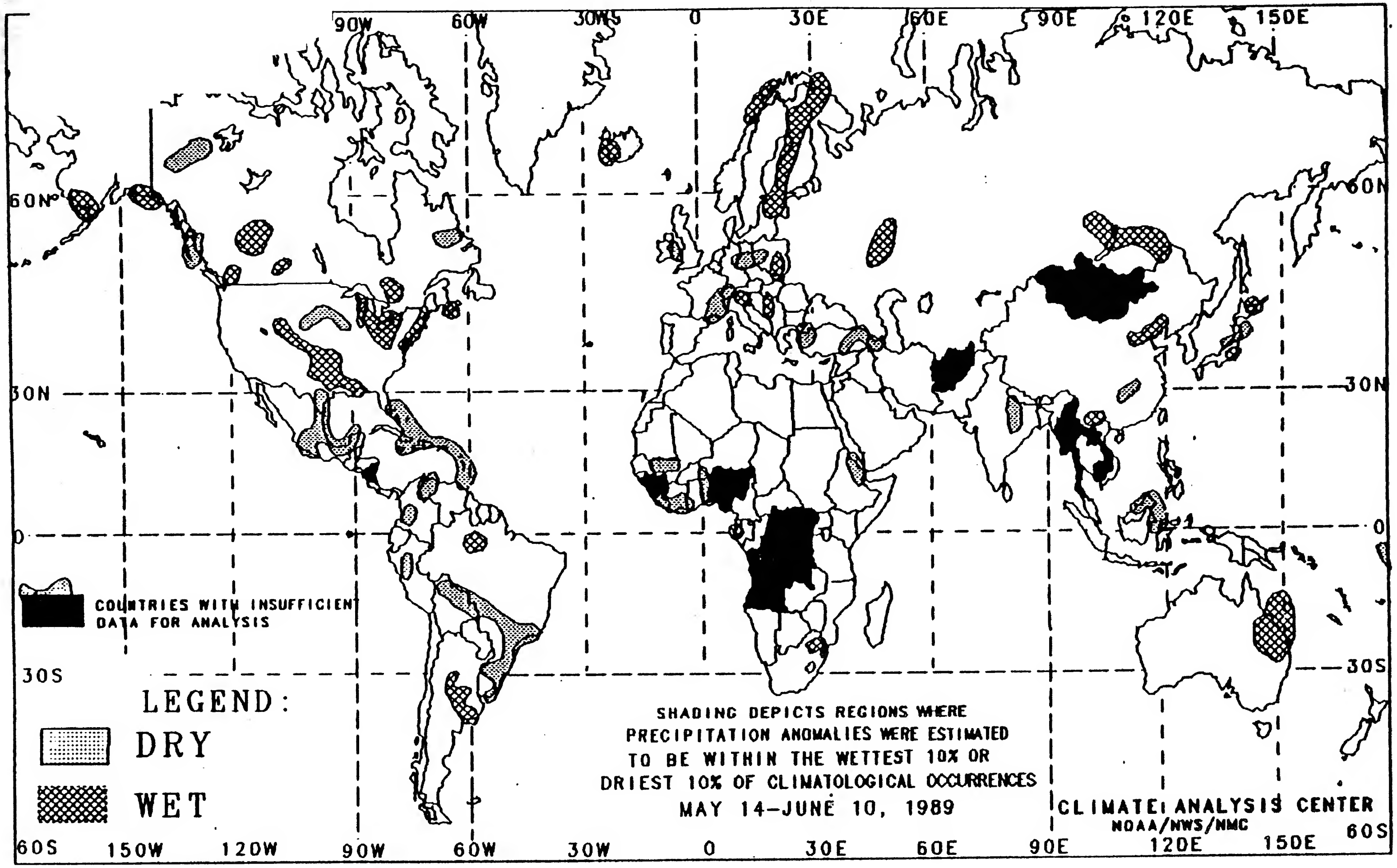
Temperature anomalies are not depicted unless the magnitude of ɔerature departures from normal exceeds 1.5°C.

In some regions, insufficient data exist to determine the magnitude of anomalies. These regions are located in parts of tropical Africa, southwestern Asia, interior equatorial South America, and along the Arctic Coast. Either current data are too sparse or incomplete for analysis, or historical data are insufficient for determining percentiles, or both. No attempt has been made to estimate the magnitude of anomalies in such regions.

This chart shows general areas of two week temperature anomalies. Caution must be used in relating it to local conditions, especially in mountainous regions..

OBAL PRECIPITATION ANOMALIES

4 WEEKS



The anomalies on this chart are based on approximately 2500 observing stations for which at least 27 days of precipitation observations (including zero amounts) were recieved or estimated from synoptic reports. As a result of both missing observations and the use of estimates from synoptic reports (which are conservative), a dry bias in the total precipitation amount may exist for some stations used in this analysis. This in turn may have resulted in an overestimation of the extent of some dry anomalies.

In climatologically arid regions where normal precipitation for the four week period is less than 20 mm, dry anomalies are not depicted. Additionally, wet anomalies for such arid regions are not depicted unless the total four week precipitation exceeds 50 mm.

In some regions, insufficient data exist to determine the magnitude of anomalies. These regions are located in parts of tropical Africa, southwestern Asia, interior equatorial South Africa, and along the Arctic Coast. Either current data are too sparse or incomplete for analysis, or historical data are insufficient for determining percentiles, or both. No attempt has been made to estimate the magnitude of anomalies in such regions.

The chart shows general areas of four week predipitation anomalies. Caution must be used in relating it to local conditions, especially in mountainous regions.

UNITED STATES SEASONAL CLIMATE SUMMARY

SPRING (MARCH-MAY) 1989

Spring is usually characterized by the gradual northward retreat of the jet stream and the transition from the cold conditions of winter to the warm weather of summer. This change is often accompanied by severe weather. Outbreaks of severe storms began with tornadoes in the southern Plains in early March and in the East later that month. Severe weather (torrential downpours, damaging winds, large hail, and tornadoes) occurred across much of the eastern half of the United States during April and May. According to the National Climatic Data Center (NCDC), this Spring had the fourth highest number of tornadoes in the last 37 years. Late-season winter storms glazed the Northeast and mid-Atlantic in early March and the Great Lakes and Ohio Valley later in the month. Moderate to heavy snow fell on eastern Colorado and western Kansas during April, and in the middle of the month, a record late-season snowstorm hit northeastern North Carolina. In early May, nearly a foot of snow blanketed the eastern Great Lakes while the northern Rockies and northern High Plains received heavy snowfall the last week of the month. Generally zonal (west to east) flow favored fast-moving storms during March, but during April and the first half of May, an upper-level ridge of high pressure became established over the West while a trough of low pressure persisted in the East. This resulted in unusually warm conditions in the western half of the U.S. and abnormally cold weather in the East. In New England, several slow-moving cold fronts brought heavy precipitation to the region and ended most concerns of summer water shortages in the major metropolitan areas of Philadelphia, New York, and Boston.

Heavier than normal Spring precipitation was observed in southern New England, the mid-Atlantic, the eastern parts of the Great Lakes and Ohio Valley, the Pacific Northwest and northern Rockies, and in eastern Texas and western Louisiana (see Table 1, Figure 1, and Figure 2). In the Northeast (MD, DE, and all states north), most of the Spring precipitation occurred during May (the second wettest May since 1895 according to the NCDC) as excessively dry conditions prevailed during April and near normal precipitation fell during March. Some stations recorded over 20 inches of rain during the three-month period. Farther west, the third wettest March during the past 95 years (according to the NCDC) in the Pacific Northwest (WA, OR, ID) greatly contributed to the ninth wettest Spring and provided much needed moisture for the approaching dry summer season. In eastern Texas and western Louisiana, torrential rains that caused severe flooding during March and May were offset by the second driest April in the South (TX, OK, KS, LA, AR, MS) since 1895, according to the NCDC. Strong trade winds brought abundant moisture to portions of the Hawaiian Islands during the Spring as Hilo received more than five feet of rain since March 1.

Subnormal seasonal precipitation totals were reported in the central United States (especially Nebraska and Iowa), in parts of Oklahoma and Texas, and in Florida (see Table 2, Figure 1, and Figure 2). Concerns about drought began in March when below normal precipitation occurred in Nebraska, Iowa, and parts of Colorado and Wyoming. Widespread dryness covered the Great Plains and the Southwest during April, but by May, excessive dryness was limited to parts of Nebraska, Iowa, and South Dakota. Near-record April dryness dominated the statistics for Oklahoma, which had near to above normal rainfall amounts in March and May. Unusually dry conditions for the last two months in west-central Texas resulted in an abnormally dry spring. In contrast to the Northeast, Florida had a very dry May after near normal conditions in March and April as long-term deficits continued, especially in the southern half of the state. For example, Miami has measured slightly more than 10 inches of rain since last September when over 34 inches should have fallen. Persistently dry weather in southeastern Alaska during March and April was finally displaced by ample May rains; however, three-month amounts at some locations were still less than half of normal.

Very warm weather dominated much of the West from the Pacific Coast eastward to Kansas and Texas and from the Mexican border northward to Oregon and Wyoming. Record or near-record warmth prevailed across the West during March, April, and May and resulted in the first and third warmest Spring since 1895 in the Southwest (AZ, NM, UT, CO) and West (CA, NV), respectively. Seasonal average temperatures were as much as 9°F above normal in Arizona, 7°F above normal in Nevada, and 6°F above normal in California and New Mexico (see Table 3, Figure 3, and the front cover). Even coastal California, normally cooled by onshore ocean breezes, baked in the nineties and one hundreds in early April due to the hot, dry, easterly Santa Ana winds. Although unusually warm weather occurred in the Southeast during March, several cold spells in April and May resulted in near-normal seasonal temperatures. Alaska experienced relatively warm weather across most of the state during April but the mild regime was limited to the southern part of Alaska in May.

Subnormal seasonal average temperatures were found in parts of the northern Plains, the Great Lakes, and in most of the eastern third of the country. Only a few stations averaged more than 2°F below normal for the season (see Table 4, Figure 3, and the front cover). The northern Plains experienced below normal temperatures in March and May and near normal conditions in April. In contrast, the western Great Lakes had relatively cold weather in March and April while the eastern Great Lakes experienced rather chilly conditions throughout April and May. Unseasonably cool conditions during April and early May offset warm weather during March and late May in the central Appalachians and mid-Atlantic as seasonal temperatures averaged slightly below normal. After a cold spell during March, near normal temperatures returned to eastern Alaska for the rest of the season. Near normal temperatures prevailed across Hawaii except for relatively cool conditions in April.

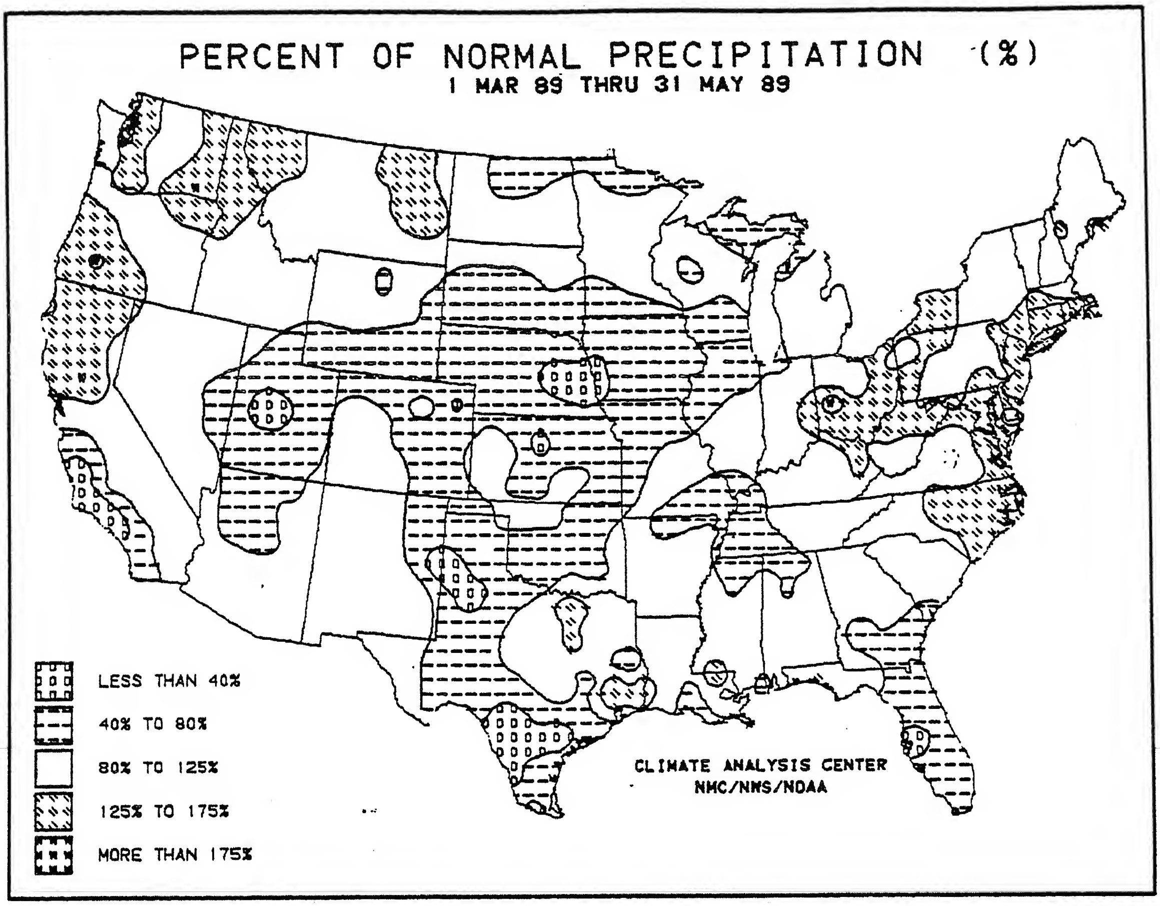


Figure 1. Percent of normal precipitation during the Spring (March-May) 1989. Subnormal precipitation was observed in most of the Plains, the Tennessee and middle Mississippi Valleys, Florida, and southern California while wetness prevailed in the Pacific Northwest, mid-Atlantic, and lower Mississippi Valley.

TABLE 1. SPRING (MARCH-MAY) STATIONS WITH MORE THAN 150% OF NORMAL PRECIPITATION AND MORE THAN 15 INCHES OF PRECIPITATION; OR, STATIONS WITH MORE THAN 13 INCHES OF PRECIPITATION AND NO NORMALS.

STATION	TOTAL (INCHES)	PCT. OF NORMAL	STATION	TOTAL (INCHES)	PCT. OF NORMAL
HILO/LYMAN, HAWAII, HI	64.33	178.7	BRIDGEPORT, CT	16.73	151.4
CAPE HATTERAS, NC	25.81	231.3	NEWPORT NEWS/HENRY, VA	16.72	***
KOKEE, KAUAI, HI	24.39	171.6	EUGENE, OR	16.51	168.8
WASHINGTON/ANDREWS AFB,MD	21.93	***	CLEVELAND, OH	16.33	170.8
DAYTON, OH	21.06	207.5	MILTON/WHITING NAS, FL	16.29	***
FT. BELVOIR/DAVISON AAF, VA	20.96	***	BALTIMORE, MD	16.11	154.2
DOVER AFB, DE	19.94	176.0	WASHINGTON/NATIONAL, DC	15.57	158.7
KAHALUI, MAUI, HI	19.15	445.4	REDDING, CA	15.43	170.3
HOUSTON, TX	19.00	170.1	JACKSONVILLE/NEW RIVER, NC	15.30	***
PORT ARTHUR, TX	18.83	154.6	DAYTON/WRIGHT-PATERSON, OH	15.23	***
NEW YORK/KENNEDY, NY	18.59	166.7	SHREVEPORT/BARKSDALE, LA	15.22	***
HARTFORD, CT	18.37	160.0	WILLOW GROVE NAS, PA	14.39	***
FAYETTEVILLE/POPE AFB, NC	18.12	***	NORFOLK/CHAMBER NAS, VA	13.70	***
FAYETTEVILLE/FT. BRAGG, NC	17.93	***	CHERRY POINT MCAS, NC	13.67	***
WILMINGTON, NC	17.88	159.1	COLUMBUS AFB, MS	13.48	***
FT. WORTH/MEACHAM, TX	17.55	***	FT. WORTH/CARSWELL AFB, TX	13.19	***
COLUMBUS/FT. BENNING, GA	16.93	***	FALMOUTH/OTIS AFB, MA	13.17	***
CHARLESTON, WV	16.74	150.1	MCCOMB, MS	13.00	***

(Note: Stations without precipitation normals are indicated by asterisks.)

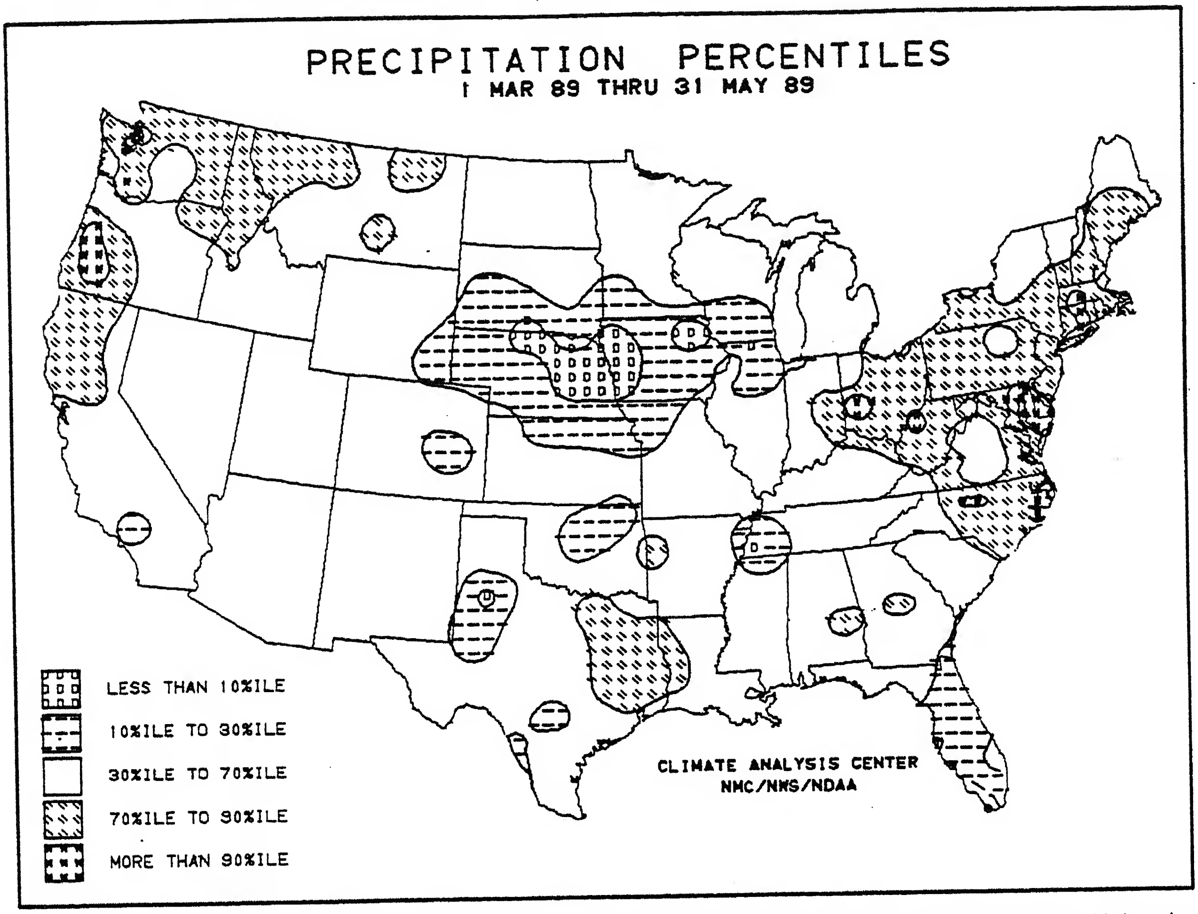


Figure 2. Precipitation percentile during the Spring (March-May) 1989. Statistically and historically, Nebraska and Iowa experienced extreme dryness while parts of the mid-Atlantic, New England, eastern Ohio Valley, and Pacific Northwest recorded ample precipitation.

TABLE 2. SPRING (MARCH-MAY) STATIONS WITH LESS THAN 60% OF NORMAL PRECIPITATION AND MORE THAN SEVEN INCHES OF NORMAL PRECIPITATION.

STATION	TOTAL (INCHES)	PCT. OF NORMAL	NORMAL (INCHES)
LINCOLN, NE	1.41	16.4	8.59
BEEVILLE NAS, TX	1.50	19.1	7.85
RUSSELL, KS	2.36	29.2	8.09
GRAND ISLAND, NE	2.39	30.5	7.84
ESCENABA, MI	2.68	37.2	7.21
TAMPA, FL	2.74	31.9	8.60
NORTH OMAHA, NE	3.12	34.2	9.13
KANSAS CITY/MUNI.,MO	3.16	38.4	8.22
SIOUX CITY, IA	3.30	44.4	7.43
VICTORIA, TX	3.51	41.7	8.42
NORFOLK, NE	3.52	47.6	7.40
MIAMI, FL	4.02	34.6	11.61
SIOUX FALLS, SD	4.04	56.9	7.09
SAN ANTONIO, TX	4.09	53.2	7.68
HANCOCK, MI	4.17	58.1	7.17
MASON CITY, IA	4.43	50.9	8.71
SPENCER, IA	4.51	56.4	7.99
PALACIOS, TX	4.53	49.8	-9.09
BRUNSWICK, GA	4.61	44.3	10.40
CHICAGO/O'HARE, IL	4.61	47.6	9.69
HOBART, OK	4.61	54.2	8.49
FT. SILL, OK	4.69	46.9	9.99
WATERLOO, IA	4.88	49.4	9.88
CEDAR RAPIDS, IA	5.04	47.1	10.71
QUINCY, IL	5.50	48.4	11.37
JUNEAU, AK	5.54	57.6	9.60
DUBUQUE, IA	5.66	49.1	11.52
OTTUMWA, IA	5.71	58.7	9.73
KETCHIKAN, AK	6.44	19.1	33.72
SITKA, AK	6.94	38.8	17.89
HARRISON, AR	7.37	54.6	13.49
TULSA, OK	7.41	59.9	12.37
LAFAYETTE, LA	8.35	57.6	14.50
ANNETTE ISLAND, AK	8.94	36.3	24.60

TABLE 3. SPRING AVERAGE TEMPERATURES 4.0°F OR MORE ABOVE NORMAL.

STATION	DEPARTURE (°F)	AVERAGE (°F)
PHOENIX, AZ	+9.2	77.8
PRESCOTT, AZ	+8.4	58.2
GLENDALE/LUKE AFB, AZ	+7.6	75.3
TUCSON, AZ	+6.8	72.1
FLAGSTAFF, AZ	+6.8	48.7
TUCSON/DAVIS-MONTHAN AFB,AZ	+6.7	71.6
LAS VEGAS, NV	+6.5	70.6
YUMA, AZ	+6.0	77.0
WINSLOW, AZ	+5.9	59.4
VICTORVILLE/GEORGE AFB, CA	+5.7	63.1
ROSWELL, NM	+5.6	65.6
ALBUQUERQUE, NM	+5.6	61.0
ELY, NV	+5.6	47.2
DEMING, NM	+5.4	64.1
RENO, NV	+5.4	52.6
FARMINGTON, NM	+5.3	55.9
CEDAR CITY, UT	+5.3	52.8
DOUGLAS, AZ	+5.2	65.1
ST. PAUL ISLAND, AK	+5.2	34.0
THERMAL, CA	+4.9	75.4
TUCUMCARI, NM	+4.9	62.1
TRINIDAD, CO	+4.9	54.2
FT. COLLINS, CO	+4.9	51.3
OGDEN/HILL AFB, UT	+4.8	54.0
CLOVIS/CANNON AFB, NM	+4.7	61.0
IMPERIAL, CA	+4.5	74.9
BLYTHE, CA	+4.4	75.4
GRAND JUNCTION, CO	+4.4	56.1
ROCK SPRINGS/SWEETWATER,WY	+4.4	44.4
LUBBOCK, TX	+4.3	64.1
FRESNO, CA	+4.2	64.9
EUREKA, CA	+4.2	54.1
LOVELOCK, NV	+4.2	53.4
COLORADO SPRINGS, CO	+4.2	50.1
LANDER, WY	+4.2	46.5
SALT LAKE CITY, UT	+4.1	53.5
ALAMOSA, CO	+4.1	45.1
KOTZEBUE, AK	+4.1	19.0
BARROW, AK	+4.0	4.6

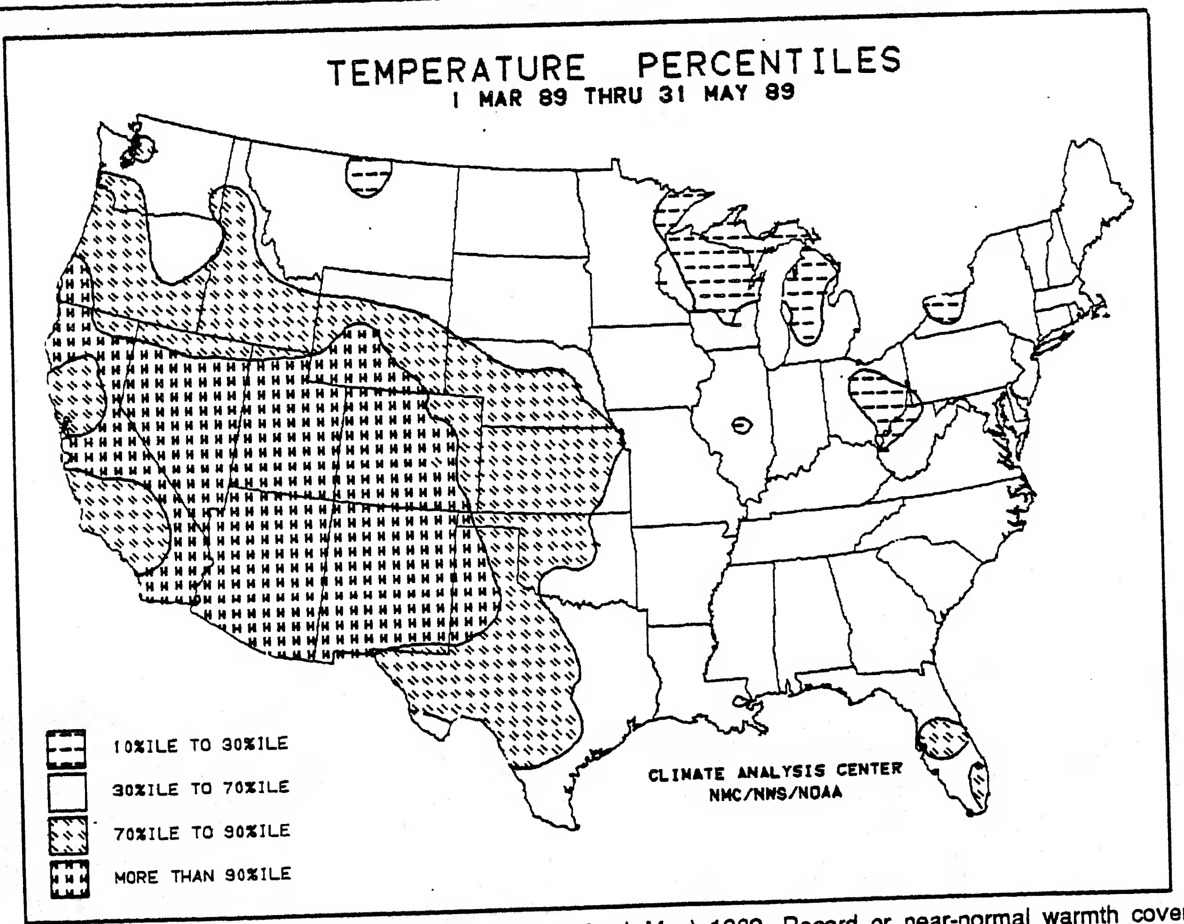
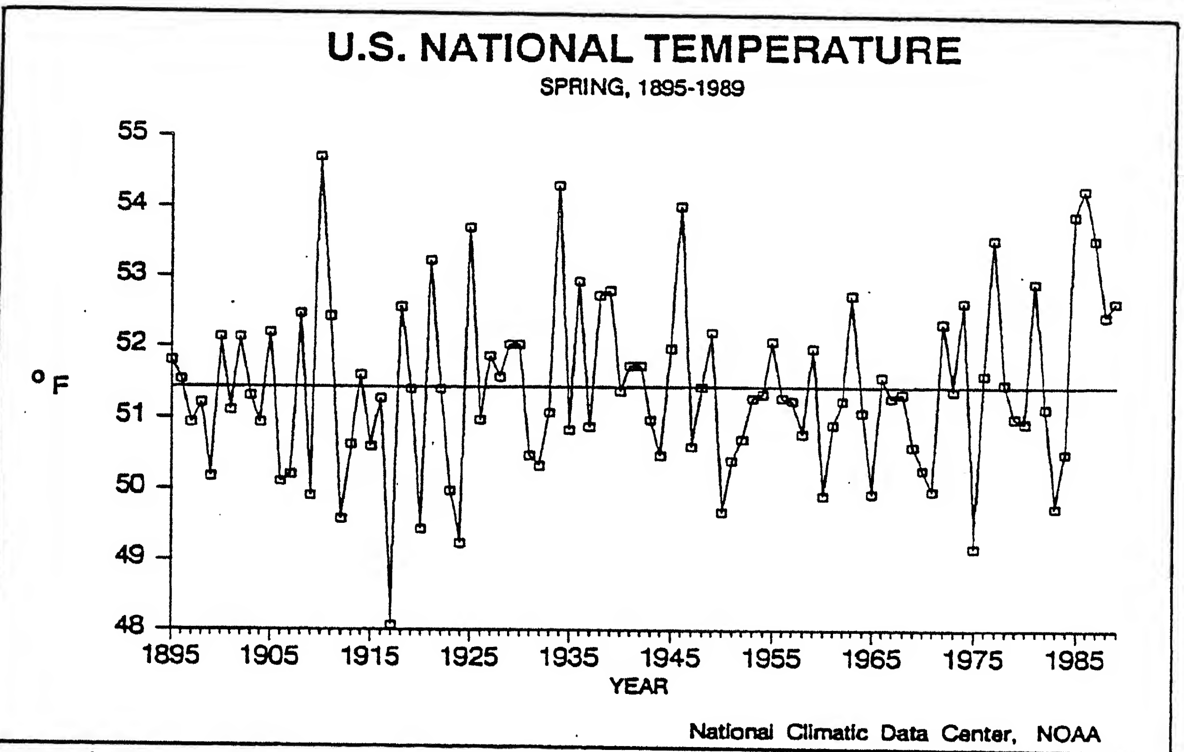


Figure 3. Temperature percentiles during the Spring (March-May) 1989. Record or near-normal warmth covered much of the Southwest during the spring months while slightly cooler than normal conditions occurred in the eastern third of the nation.

TABLE 4. SPRING AVERAGE TEMPERATURES 1.5°F OR MORE BELOW NORMAL.

STATION	DEPARTURE (°F)	AVERAGE (°F)
PARKERSBURG, WV	-2.4	51.2
SUMTER/SHAW AFB, SC	-2.3	61.2
SAGINAW, MI	-2.2	42.8
MARQUETTE, MI	-2.0	34.9
MASSENA, NY	-2.0	40.2
HAVRE, MT	-2.0	40.4
GRAND RAPIDS, MI	-2.0	43.8
MORGANTOWN, WV	-2.0	49.8
PARK FALLS, WI	-1.9	38.2
GREEN BAY, WI	-1.9	40.6
MILES CITY, MT	-1.9	42.4
WALLA WALLA, WA	-1.9	51.2
ESCENABA, MI	-1.8	36.8
ROCHESTER, NY	-1.8	43.5
COLUMBUS, OH	-1.8	49.1
WRIGHTSTOWN/MCGUIRE AFB, NJ	-1.8	50.4
ELKINS, WV	-1.7	47.8
SPRINGFIELD, IL	-1.6	50.8
GREENVILLE, SC	-1.6	58.6
DULUTH, MN	-1.5	35.8
GREAT FALLS, MT	-1.5	41.0
BUFFALO, NY	-1.5	43.4
GOLDSBORO/JOHNSON AFB, NC	-1.5	59.8



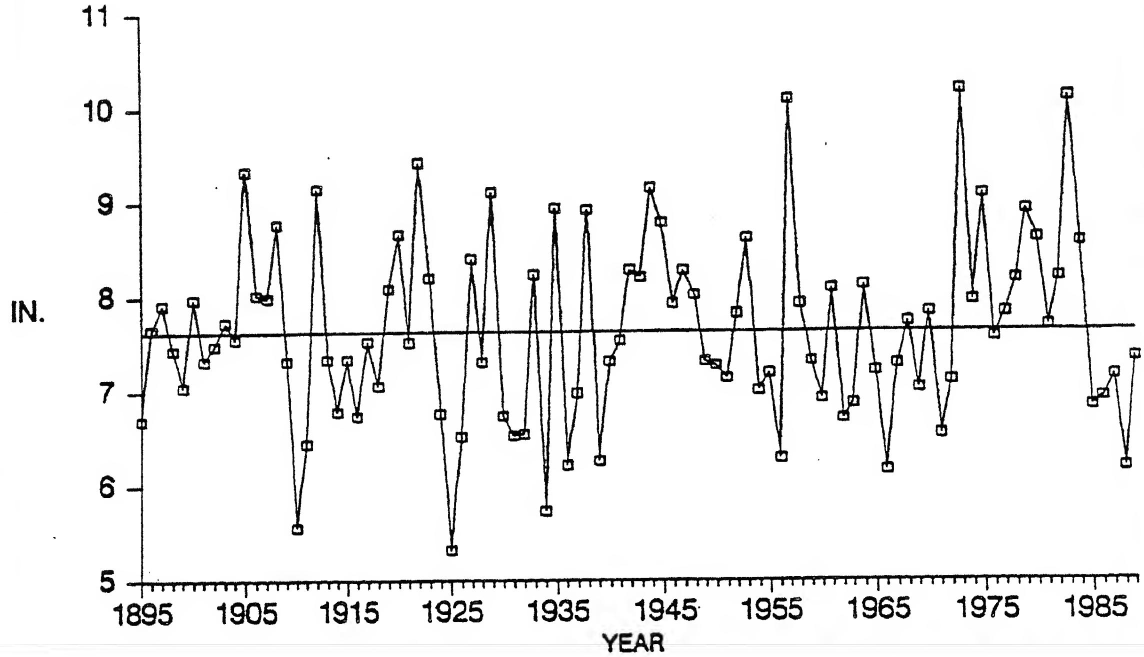
The data are obtained from NCDC's cooperative data network. Individual stations are grouped into state climate divisions (344 in the contiguous U.S.) and an average monthly temperature and total precipitation value is calculated. An average state value is then determined for precipitation and temperature from the climate division values and are area-weighted. A national average for both temperature and precipitation is taken from these area-weighted state values and compared during the past 95 years (since 1895). Some climate division boundaries were different before 1931, but an algorithm was developed to compensate for the discrepancy. The number of cooperative stations has increased from approximately 500 in 1895 to nearly 8000 in 1989. The average (mean) value is depicted in each graph and incorporates the entire time preiod (95 years).

Temperature and Precipitation Rankings for Spring 1989, based on the period 1895-1989.
1 = driest/coldest, 95 = wettest/hottest.

Region	Precipitation	Temperature
National	43	80
Northeast	84	37
East North Central	18	33
Central	48	38
Southeast	61	39
West North Central	26	52
South	26	73
Southwest	7	95
Northwest	87	70
West	58	93

U.S. NATIONAL PRECIPITATION

SPRING, 1895-1989



National Climatic Data Center, NOAA

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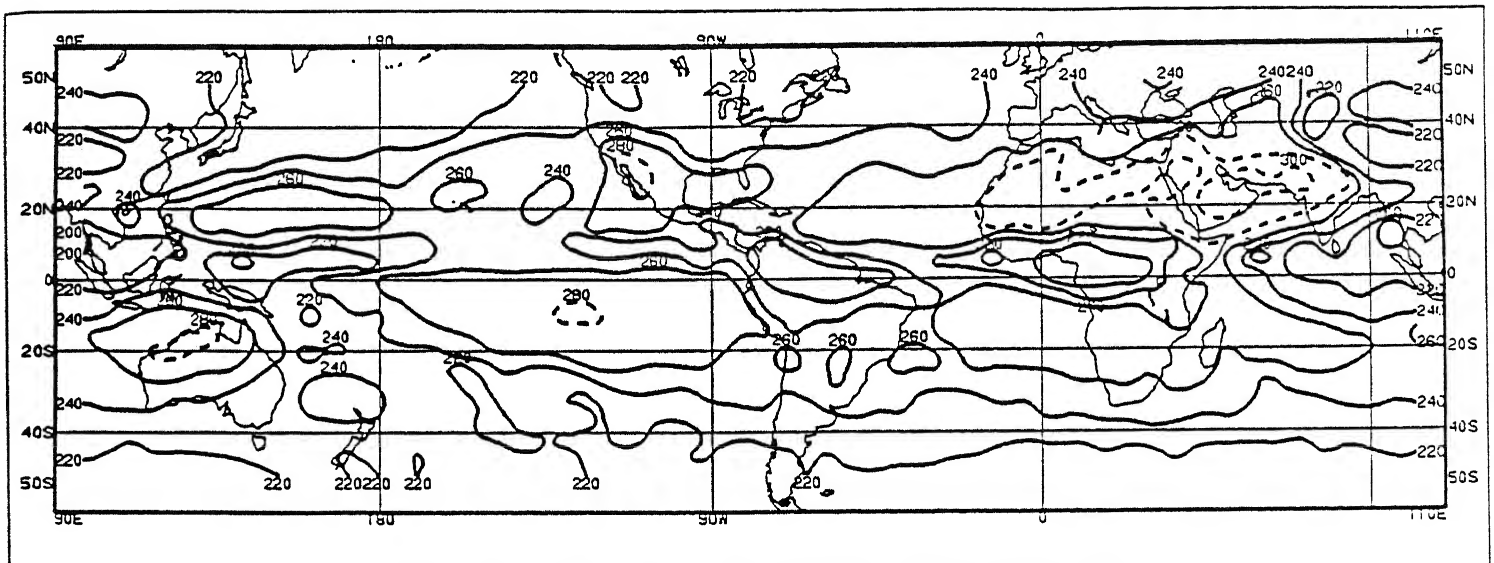
Note: Caution should be exercised when using the national temperature and precipitation rankings (especially the latter one) as the national average is obtained from several regions with different seasonal climate regimes. For example, a region with large normal precipitation (e.g. the Southeast in the Spring) can dominate a region with small normal precipitation (e.g. the West in the Spring).

Precipitation Rankings for Spring 1989, based on the period 1895 to 1989. 1 = driest, 95 = wettest.

State	Rank	State	Rank	State	Rank	State	Rank
	53	IA	9	NE	2	RI	88
	18	KS	11	NV	39	SC	63
	61	KY	61	NH	64	SD	55
	66	LA	72	NJ	90	TN	50
	5	ME	55	NM	2	TX	19
	91	MD	90	NY	75	UT	13
	93	MA	59	NC	92	VT	58
	27	MI	35	ND	58	VA	82
	43	MN	30	OH	91	WA	82
	74	MS	44	OK	18	WV	84
	26	MO	15	OR	84	WI	28
	69	MT	79	PA	87	WY	11

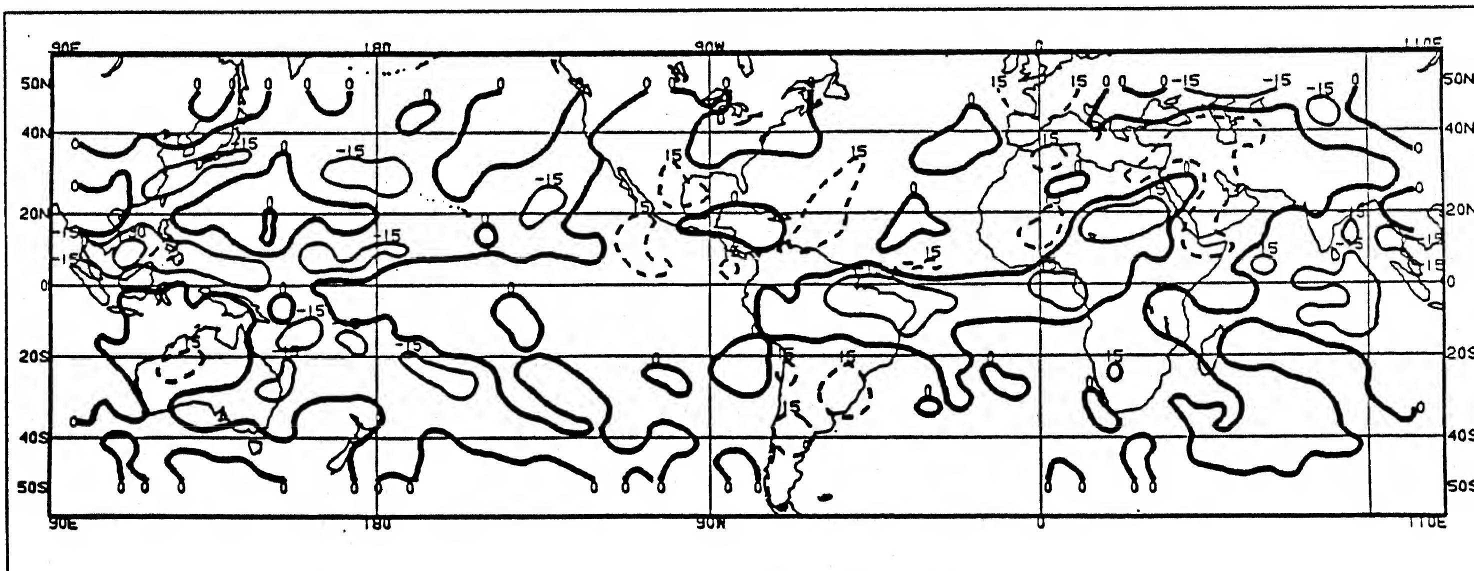


Monthly Mean Outgoing Longwave Radiation (OLR) for May 1989

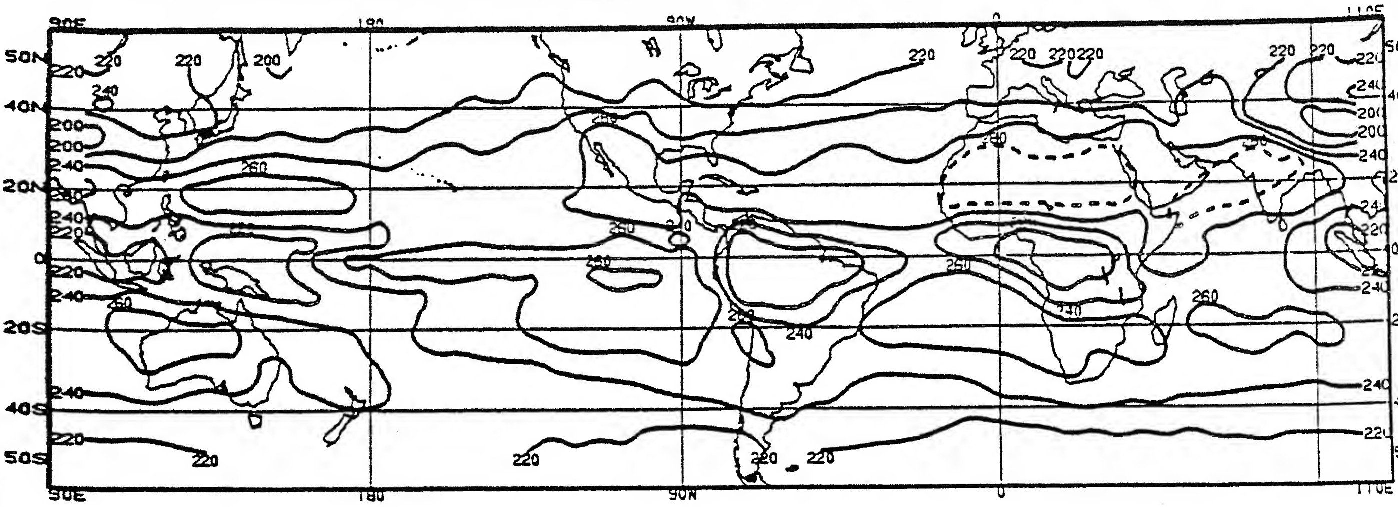
EXPLANATION

The mean monthly outgoing long wave radiation (OLR) as measured by the NOAA-9 AVHRR IR window channel by NESDIS/SRL (top). Data are accumulated and averaged over 2.5° areas to a 5° Mercator grid for display. Contour intervals are 20 Wm^{-2}, and contours of 280 Wm^{-2} and above are dashed. In tropical areas (for our purposes 20°N-20°S) that recieve primarily convective rainfall, a mean OLR value of less than 220 Wm^{-2} is associated with significant monthly precipitation, whereas a value greater than 260 Wm^{-2} normally indicates little or no precipitation. Care must be used in interpreting this chart at higher latitudes, where much of the precipitation is non-convective, or in some tropical coastal or island locations, where the precipitation is primarily orographically induced. The approximate relationship between mean OLR and precipitation amount does not necessarily hold in such locations.

The mean monthly outgoing long wave radiation anomalies (bottom) are computed as departures from the 1974-1983 base period mean (1978 missing). Contour intervals are 15 Wm^{-2}, while positive anomalies (greater than normal OLR, suggesting less than normal cloud cover and/or precipitation) are dashed and negative anomalies (less than normal OLR, suggesting greater than normal cloud cover and/ or precipitation) are solid.



Monthly Mean Outgoing Longwave Radiation (OLR) Anomaly for May 1989



Seasonal Mean Outgoing Longwave Radiation (OLR) for March - May 1989

EXPLANATION

The mean seasonal outgoing long wave radiation (OLR) as measured by the NOAA-9 AVHRR IR window channel by NESDIS/SRL (top). Data are accumulated and averaged over 2.5° areas to a 5° Mercator grid for display. Contour intervals are 20 Wm^{-2}, and contours of 280 Wm^{-2} and above are dashed. In tropical areas (for our purposes 20°N-20°S) that recieve primarily convective rainfall, a mean OLR value of less than 220 Wm^{-2} is associated with significant monthly precipitation, whereas a value greater than 260 Wm^{-2} normally indicates little or no precipitation. Care must be used in interpreting this chart at higher latitudes, where much of the precipitation is non-convective, or in some tropical coastal or island locations, where the precipitation is primarily orographically induced. The approximate relationship between mean OLR and precipitation amount does not necessarily hold in such locations.

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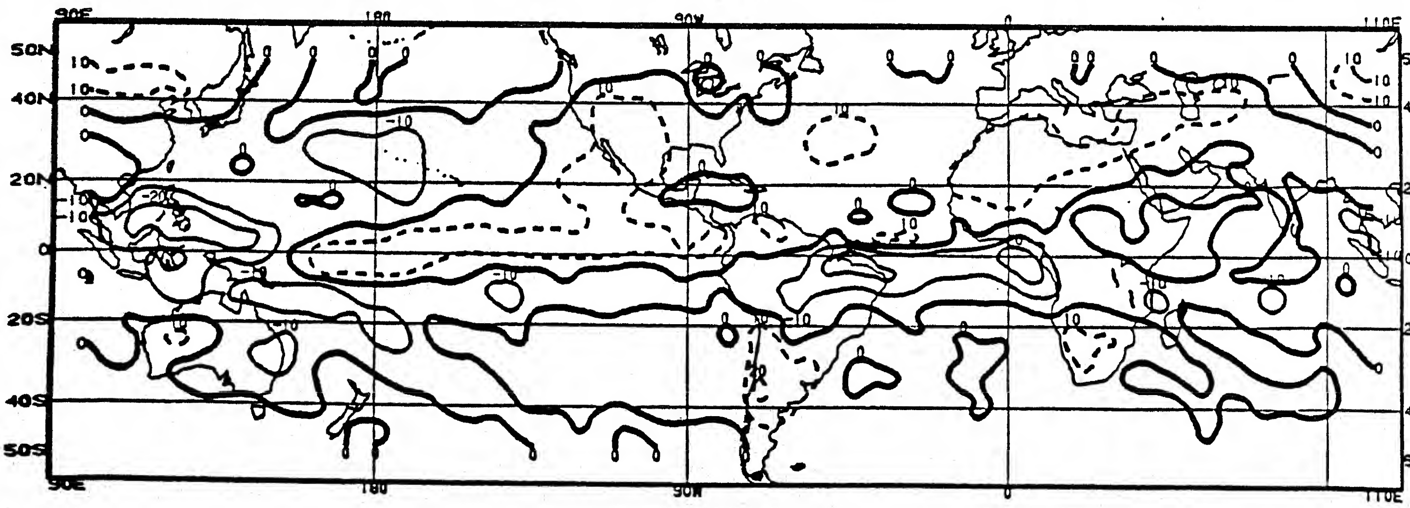

Seasonal Mean Outgoing Longwave Radiation (OLR) Anomaly for March - May 1989